cumbrous old affair. The great Begiomontanus, reading this account, was so impressed that he constructed an instrument according to the Rabbi's recommendations, which he named *Jacob's Staff.* This was the instrument which accompanied all the great explorers of the age of the Renaissance on their travels, and was principally relied upon by them for their calculations—Vasco da Gama, Magellan, even Christopher Columbus himself. It remained in use for approximately three centuries; its general employment among mariners was not given up until John Hadley's reflecting quadrant was adopted by the British Admiralty in 1734; and even after that date it long continued to be used by surveyors for land-measurements.[1]

The quadrant, used alone, was inadequate as an aid in navigation; and, in the heyday of the Portuguese maritime activity, at the close of the fifteenth century, the scientists at the Court of King Joao II of Portugal advised him to find out whether it was possible to extend the scope of the mechanical devices hitherto employed by adapting to nautical use the old planispheric astrolabe known to the Greeks. The King entrusted this task to a commission of three scientists. One of them was Martin Behaim (that is "the Bohemian"), said by some

[1]"The 'Jacob's Staff' consisted of a long central bar marked with a scale and provided with a movable cross-bar (or four of varying sizes, used alternatively). One end was placed to the eye and the traversal was adjusted until one end was in line with the sun and the other with the horizon. By calculating the length of the cross-piece

and its distance from the eye, the angle between the sun and the horizon could easily be calculated. With the aid of this instrument, it was thus possible to prick the chart while at sea, instead of landing (as had hitherto been necessary) each time the position was to be determined. A remarkable representation of the instrument is constantly before our eyes in the picture of the Knave of Diamonds, as it is to be found in any ordinary pack of playing-cards. Under the name 'sun-glass', it continued to be used by Suffolk sailors within living memory. From Marlowe's *Tamburlaine the Great*, II. iii. 3, it seems that, besides being used for navigation, Jacob's Staff was the earliest form of range-finder.